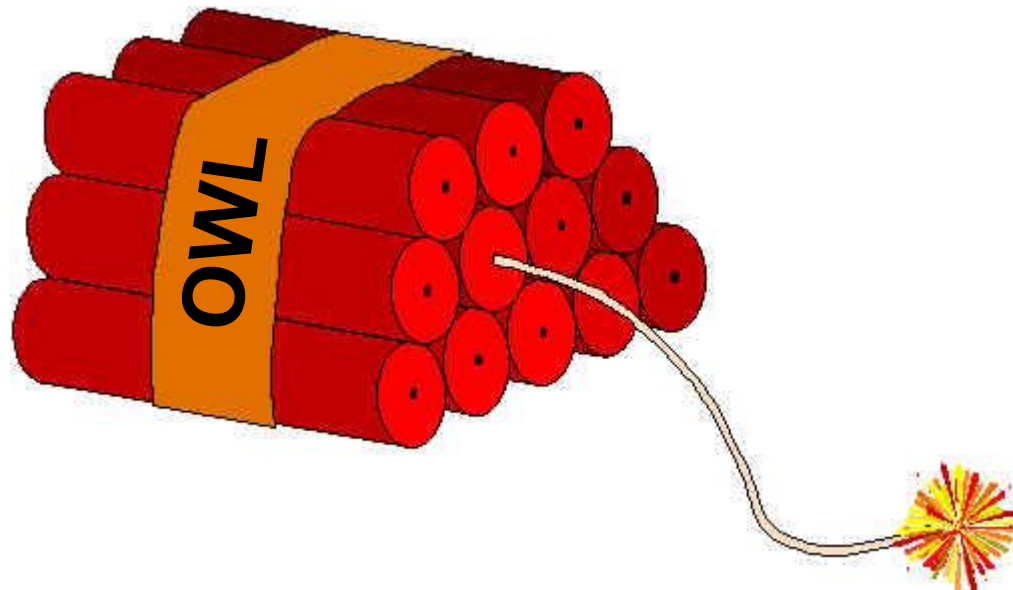


AMIA 2009

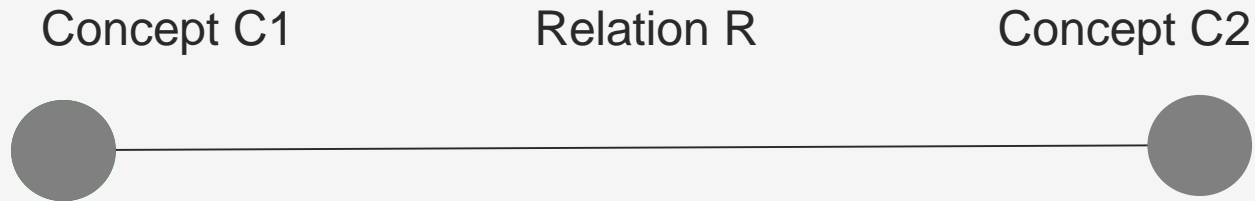
SAN FRANCISCO • November 14-18

Biomedical and Health Informatics: From Foundations to Applications to Policy

Relational statements in OWL Recipe for Failure ?



Naïve, semantic network style approach to relations



Examples

Hepatitis

Hand

Aspirin

hasLocation

hasPart

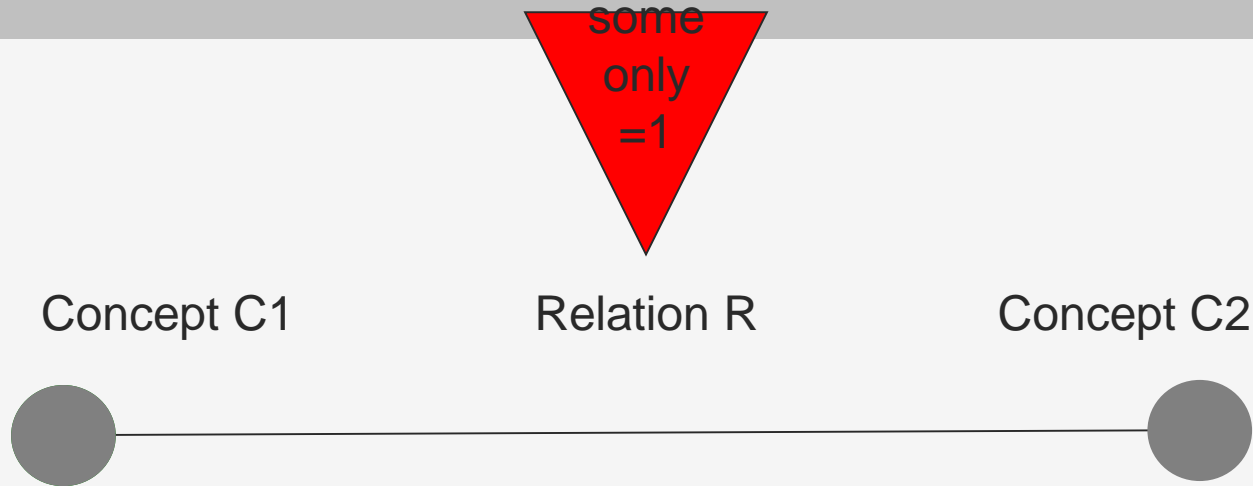
treats

Liver

Thumb

Headache

OWL-DL approach to relations: requires quantification



Examples

Hepatitis

Hand

Aspirin

hasLocation

hasPart

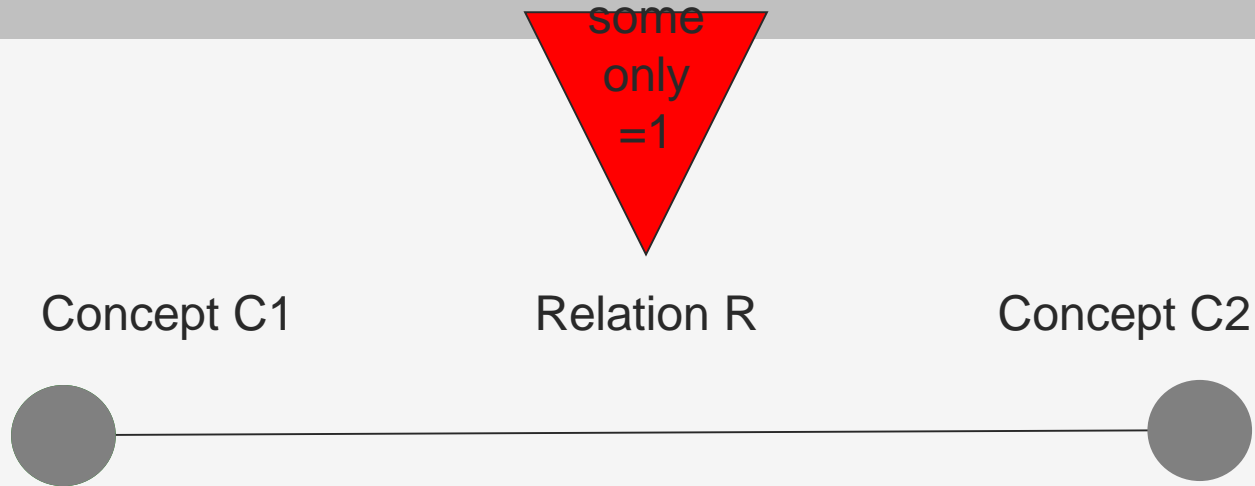
treats

Liver


Thumb

Headache

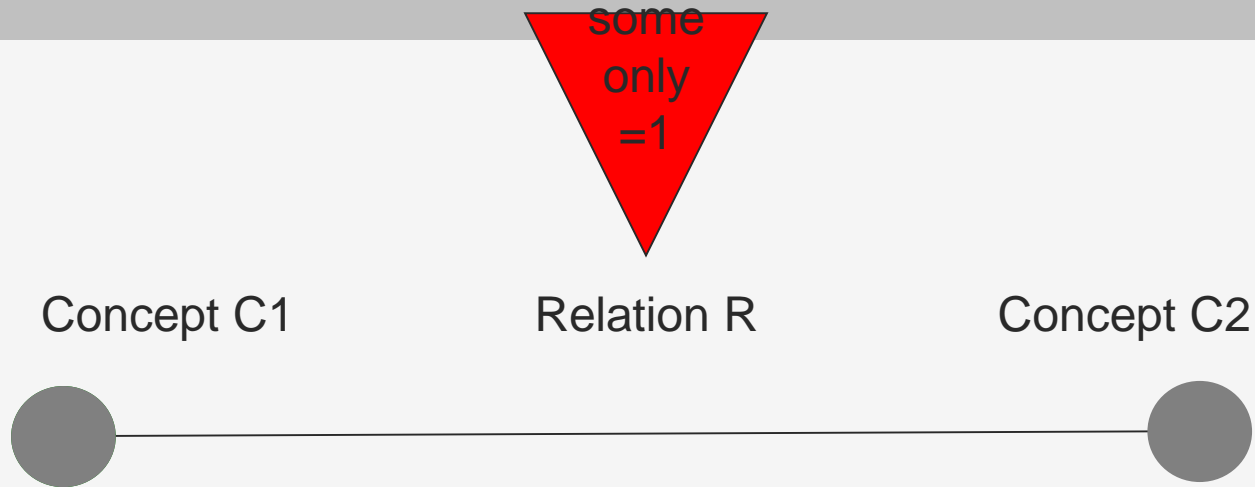
OWL-DL approach to relations: requires quantification





Examples

Hepatitis subClassOf **hasLocation** some **Liver** 
Hand hasPart Thumb
Aspirin treats Headache

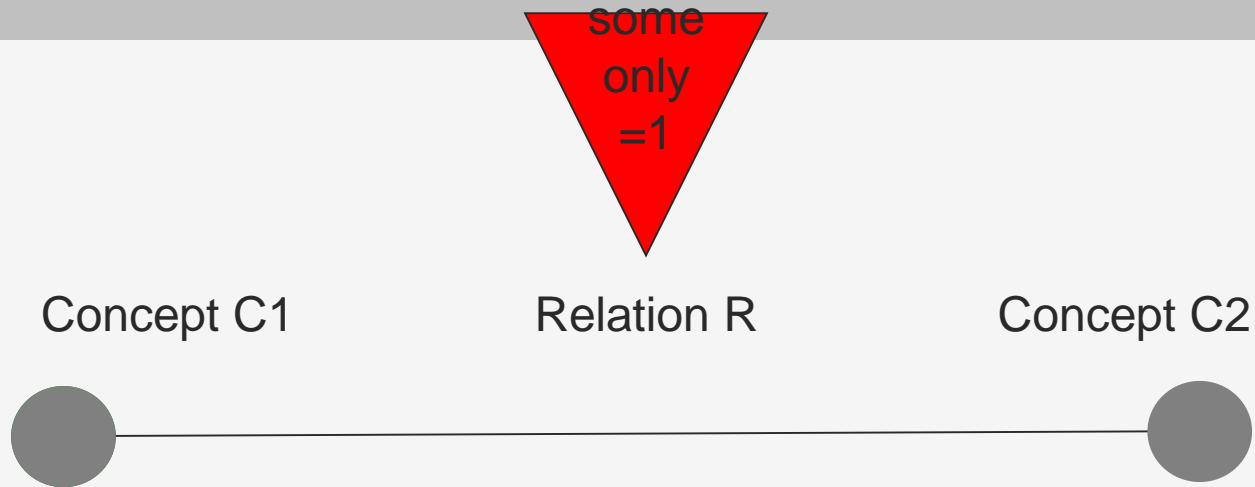
OWL-DL approach to relations: requires quantification






Examples

Hepatitis	subClassOf	hasLocation	some	Liver	
Hand	subClassOf	hasPart	some	Thumb	
Aspirin		treats		Headache	

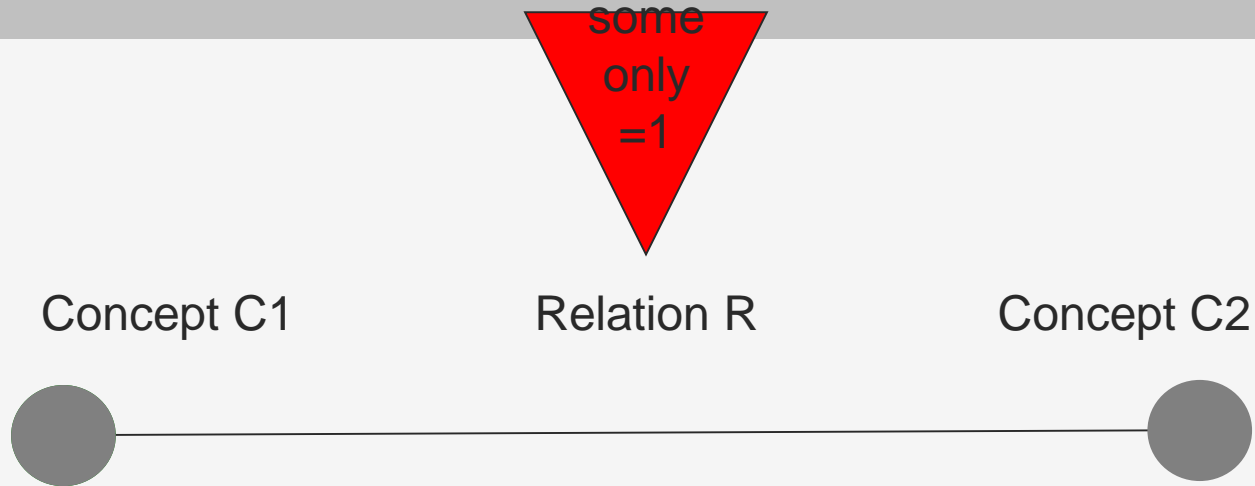
OWL-DL approach to relations: requires quantification







Examples

Hepatitis	subClassOf	hasLocation	some	Liver	
Hand	subClassOf	hasPart	some	Thumb	
Aspirin	subClassOf	treats	some	Headache	

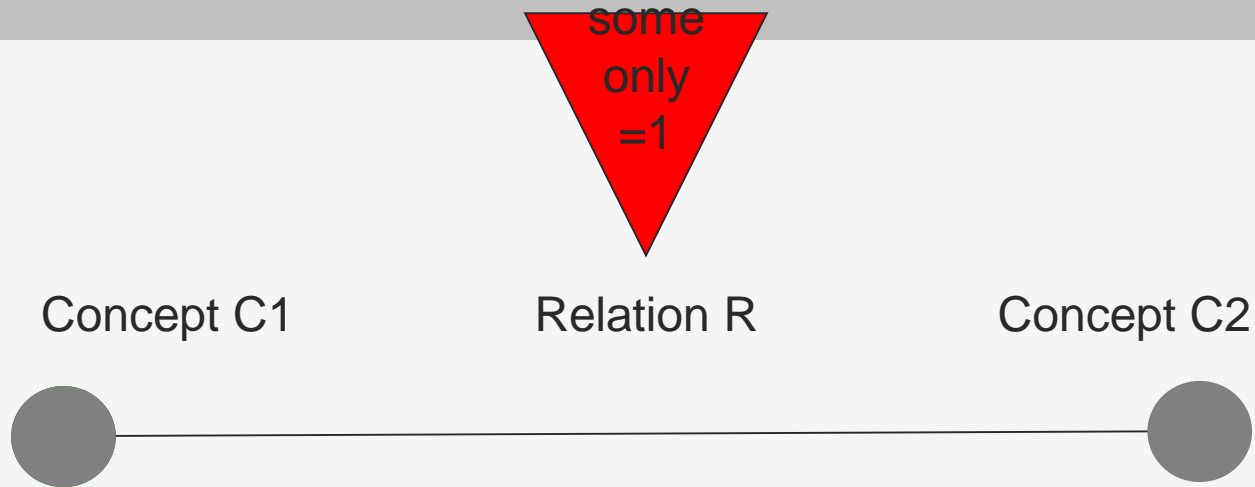
OWL-DL approach to relations: requires quantification







Examples

Hepatitis	subClassOf	hasLocation	some	Liver	
Hand	subClassOf	hasPart	some	Thumb	
Aspirin	subClassOf	treats	some	Headache	
Hand	subClassOf	hasPart	only	Thumb	

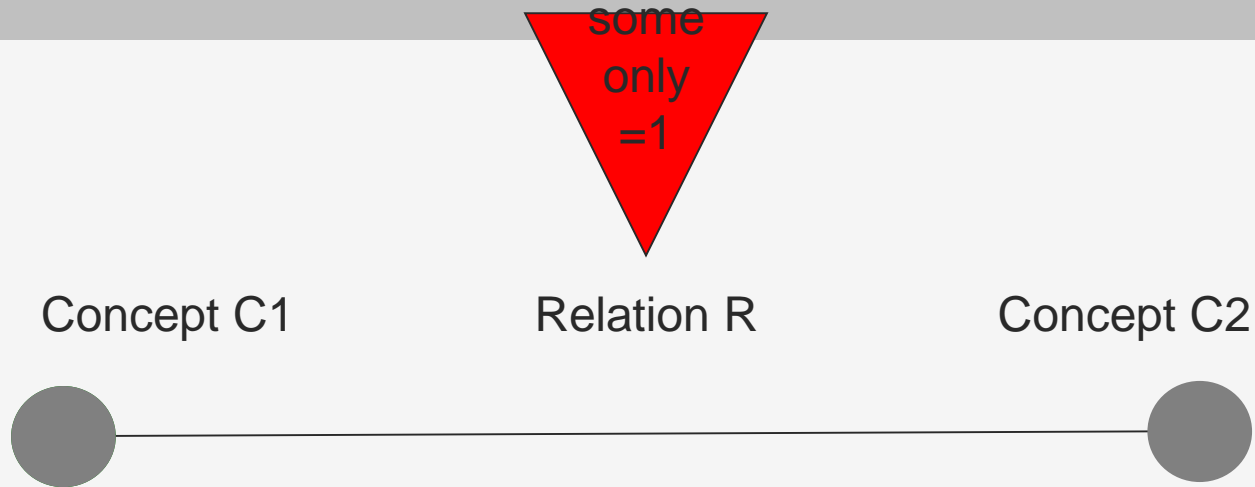
OWL-DL approach to relations: requires quantification







Examples

Hepatitis	subClassOf	hasLocation	some	Liver	
Hand	subClassOf	hasPart	some	Thumb	
Aspirin	subClassOf	treats	some	Headache	
Thumb	subClassOf	partOf	some	Hand	

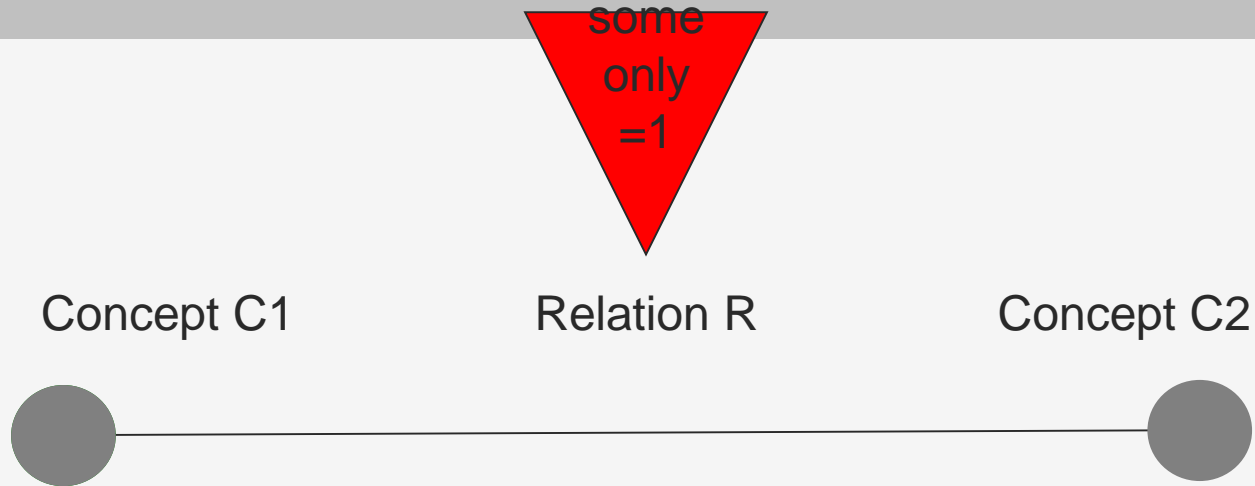
OWL-DL approach to relations: requires quantification







Examples

Hepatitis	subClassOf	hasLocation	some	Liver	
Hand	subClassOf	hasPart	some	Thumb	
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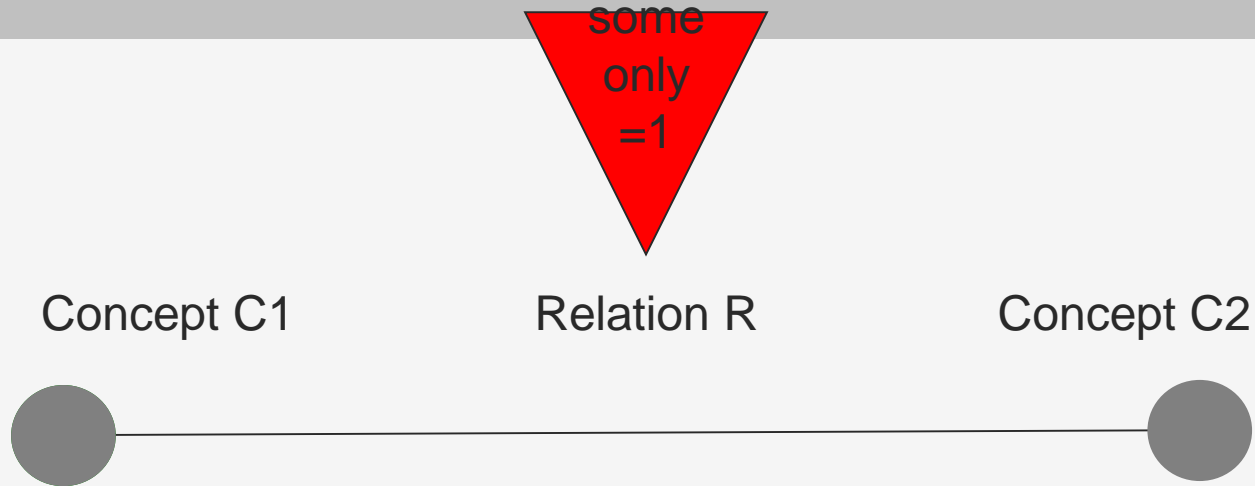
OWL-DL approach to relations: requires quantification







Examples

Hepatitis	subClassOf	hasLocation	some	Liver	
Hand	subClassOf	hasPart	some	Thumb	
Aspirin	subClassOf	treats	some	Headache	
Headache	subClassOf	treatedBy	some	Aspirin	

OWL-DL approach to relations: requires quantification



Examples

Hepatitis	subClassOf	hasLocation	some	Liver	
Hand	subClassOf	hasPart	some	Thumb	
Aspirin	subClassOf	treats	some	Headache	
Headache	subClassOf	treatedBy	only	Aspirin	

Typical errors

Tonsillectomy planned SubClassOf
rg **some** (*associatedProcedure* **some** *Tonsillectomy*) and...

Skin_Squamous_Cell_Carcinoma_in_situ SubClassOf
(*diseaseMayHaveFinding* **some** *Erythema*) and...

Congenital absence of bile duct SubClassOf
findingSite **some** *BileDuctStructure* ...

anti-Muellerian hormone isoform 1 unmodified form equivalentTo
'*anti-Muellerian hormone isoform 1*'
and *lacks_modification* **some** '*post-translational protein modification*'

absent subClassOf
reciprocal_of **some** '*lacking processual parts*'

Conclusion

- The use of OWL requires a precise ontological commitment
 - *is a hand without a thumb still a hand*
 - *what about a severed thumb*
- Many important statements cannot be adequately represented
 - OWL semantic enforces statements of the type „for all... some“ or „for all... only“
 - No way to express what is mostly or normally true